

Claims 1 to 3 (cancelled)

Claim 4 (currently amended) An omni-directional imaging assembly comprising a solid omni-directional lens said omni-directional lens comprising:

- (a) a vertical axis of symmetry;
- (b) an upper surface, at least part of which is capable of reflecting rays that arrive from the inner side of the omni-directional lens;
- (c) a transparent perimeter surface;
- (d) a lower convex surface, at least part of which is capable of reflecting rays that arrive from the direction of said perimeter surface;
- (e) a transparent circular surface maintained in said lower convex surface around said vertical axis of symmetry;

wherein light rays from a first 360 degrees, panoramic, scene are refracted by said transparent perimeter surface, are then reflected by said lower convex surface towards said upper surface, and then reflected by said upper surface towards said transparent circular surface, then refracted and exit said omni-directional lens; and

~~An omni-directional imaging assembly according to claim 1,~~ wherein the curvature of the upper surface and/or the curvature of the lower convex surface of said omni-directional lens and the material of which said omni-directional lens is made are designed selected to enable Total Internal Reflection of rays that arrive at said surfaces, without the use of a reflective coating.

Claim 5 (currently amended) An omni-directional imaging assembly comprising a solid omni-directional lens said omni-directional lens comprising:

- (a) a vertical axis of symmetry;
- (b) an upper surface, at least part of which is capable of reflecting rays that arrive from the inner side of the omni-directional lens;
- (c) a transparent perimeter surface;
- (d) a lower convex surface, at least part of which is capable of reflecting rays that arrive from the direction of said perimeter surface;
- (e) a transparent circular surface maintained in said lower convex surface around said vertical axis of symmetry;

wherein light rays from a first 360 degrees, panoramic, scene are refracted by said transparent perimeter surface, are then reflected by said lower convex surface towards said upper surface, and then reflected by said upper surface towards said transparent circular surface, then refracted and exit said omni-directional lens;

An said omni- directional imaging assembly according to claim 1, further comprising a second transparent circular area maintained in the upper surface of the omni-directional lens around the vertical axis of symmetry; said second transparent circular area enabling penetration of rays from a second scene, at least partially different than the first scene, into said omni-directional lens, wherein rays from said second scene travel through said omni-directional lens, are refracted by the transparent circular

surface in the lower surface, and exit said omni-directional lens.

Claim 6 (currently amended) An omni-directional imaging assembly according to claim 5, further comprising an optical structure located coaxially with the omni-directional lens and above the upper surface of said lens; said optical structure ~~being designed to control and enhance~~ comprising refracting and/or reflecting surfaces having curvatures that control and enhance the optical qualities of the second scene, before rays originating in said second scene are refracted by the second transparent circular area.

Claim 7 (currently amended) An omni-directional imaging assembly according to claim 6, wherein the optical structure ~~is designed to control~~ comprises refracting and/or reflecting surfaces having curvatures that control the aperture of the second scene.

Claim 8 (original) An omni-directional imaging assembly according to claim 6, wherein the optical structure comprises a plurality of optical elements.

Claims 9 and 10 (cancelled)

Claim 11 (currently amended) An omni-directional imaging assembly comprising a solid omni-directional lens said omni-directional lens comprising:

(a) a vertical axis of symmetry;

- (b) an upper surface, at least part of which is capable of reflecting rays that arrive from the inner side of the omni-directional lens;
- (c) a transparent perimeter surface;
- (d) a lower convex surface, at least part of which is capable of reflecting rays that arrive from the direction of said perimeter surface;
- (e) a transparent circular surface maintained in said lower convex surface around said vertical axis of symmetry;

Wherein light rays from a first 360 degrees, panoramic, scene are refracted by said transparent perimeter surface, are then reflected by said lower convex surface towards said upper surface, and then reflected by said upper surface towards said transparent circular surface, then refracted and exit said omni-directional lens;

~~An~~said omni-directional imaging assembly ~~according to claim 9,~~ further comprising an image capture device, directed towards the transparent circular surface in the lower surface of the omni-directional lens and having its optical axis coinciding with the vertical axis of symmetry of said omni-directional lens and a connector located between the omni-directional lens and the image capture device, said connector having a first edge and a second edge, wherein optical transparency exists between said first edge and said second edge, allowing light penetrating said first edge to reach and exit through said second edge essentially without distortion.

Claim 12 (original) An omni-directional imaging assembly according to claim 11, wherein the connector is cylindrical in shape.

Claim 13 (currently amended) An omni-directional imaging assembly according to claim 11, wherein the first edge of the connector is ~~designed to~~ be connected to the omni-directional lens.

Claim 14 (currently amended) An omni-directional imaging assembly according to claim 11, wherein the second edge of the connector is ~~designed to be connected to~~ the image capture device.

Claim 15 (currently amended) An omni-directional imaging assembly according to claim 11, wherein the distance between the first edge of the connector and the second edge is ~~designed to allow~~ allows optimal focus by the image capture device of the image that arrives from the direction of the omni-directional lens.

Claim 16 (original) An omni-directional imaging assembly according to claim 11, wherein the connector is fabricated together with, and as a part of, the omni-directional lens as a unified optical block.

Claim 17 (original) An omni-directional imaging assembly according to claim 11, wherein the side edges of the connector have a transparent volume allowing rays that arrive from the second edge to travel through said side edges, to exit through the first edge, and to enter the omni-directional lens.

Claim 18 (original) An omni-directional imaging assembly according to claim 17, further comprising an illumination source located adjacent to the second edge of the connector, said illumination source transmitting illumination towards the transparent volume of said connector; wherein illumination rays travel through said transparent volume of said connector, penetrate the omni-directional lens, and are distributed omni-directionally by the reflective and refractive surfaces of said omni-directional lens, thereby providing omni-directional illumination.

Claim 19 (original) An omni-directional imaging assembly according to claim 11, wherein the outer surface of the side of the connector is blackened by a coating or by the presence of a mechanical element, thereby absorbing light and preventing glare.

Claim 20 (original) An omni-directional imaging assembly according to claim 4, further comprising an illumination source located adjacent to the transparent area in the lower convex surface, said illumination source distributing illumination towards the interior of the omni-directional lens, which refracts and reflects said illumination rays distributing them omni-directionally, thereby providing omni-directional illumination.

Claim 21 (previously presented) An omni-directional imaging assembly according to claim 18, wherein the illumination source comprises a plurality of illumination sources.

Claim 22 (original) An omni-directional imaging assembly according to claim 21, wherein the illumination source is capable of illumination at several different wavelengths.

Claim 23 (currently amended) An omni-directional imaging assembly according to claim 18, wherein the fabrication material and coating material of the omni-directional lens are ~~suitable to distribute~~ transparent to the spectral range of the illumination.

Claim 24 and 25 (cancelled)

Claim 26 (currently amended) An omni-directional imaging assembly according to claim 5, further comprising a hole extending from the upper surface of the omni-directional lens to the lower convex surface around the vertical axis of symmetry, wherein said hole has a diameter ~~is designed such that~~ allows rays from the second scene ~~to~~ travel through said hole ~~to pass thereby passing~~ through said omni-directional lens.

Claim 27 (currently amended) An omni-directional imaging assembly according to claim 26, further comprising an optical element placed within the hole, wherein said optical element ~~is designed to~~ comprises refracting and/or reflecting surfaces having curvatures that control the quality of the image of the second scene.

Claim 28 (original) An omni-directional imaging assembly according to claim 27, wherein the outside surface of the optical element that is placed in the hole is coated with black coating to absorb light and prevent glare.

Claim 29 (original) An omni-directional imaging assembly according to claim 26, wherein the surface of the hole is coated with black coating to absorb light and prevent glare.

Claim 30 (original) An omni-directional imaging assembly according to claim 26, wherein the hole is cylindrical in shape.

Claim 31 (original) An omni-directional imaging assembly according to claim 26, wherein the hole is conical in shape.

Claim 32 (currently amended) An omni-directional imaging assembly comprising a solid omni-directional lens said omni-directional lens comprising:

- (a) a vertical axis of symmetry;
- (b) an upper surface, at least part of which is capable of reflecting rays that arrive from the inner side of the omni-directional lens;
- (c) a transparent perimeter surface;
- (d) a lower convex surface, at least part of which is capable of reflecting rays that arrive from the direction of said perimeter surface;



(e) a transparent circular surface maintained in said lower convex surface around said vertical axis of symmetry;

Wherein light rays from a first 360 degrees, panoramic, scene are refracted by said transparent perimeter surface, are then reflected by said lower convex surface towards said upper surface, and then reflected by said upper surface towards said transparent circular surface, then refracted and exit said omni-directional lens;

~~An~~ said omni-directional imaging assembly according to claim 1, further comprising cylindrical slots in the body of the omni-directional lens around the axis of symmetry, said slots formed in size and angle ~~such~~ so as to not interfere with the optical path of rays originating in scenes that should be covered by said omni-directional lens; wherein said slots absorb light and prevent glare.

Claim 33 (currently amended) An omni-directional imaging assembly comprising a solid omni-directional lens said omni-directional lens comprising:

- (a) a vertical axis of symmetry;
- (b) an upper surface, at least part of which is capable of reflecting rays that arrive from the inner side of the omni-directional lens;
- (c) a transparent perimeter surface;
- (d) a lower convex surface, at least part of which is capable of reflecting rays that arrive from the direction of said perimeter surface;

(e) a transparent circular surface maintained in said lower convex surface around said vertical axis of symmetry;  
wherein light rays from a first 360 degrees, panoramic, scene are refracted by said transparent perimeter surface, are then reflected by said lower convex surface towards said upper surface, and then reflected by said upper surface towards said transparent circular surface, then refracted and exit said omni-directional lens;

~~An~~ said omni-directional imaging assembly ~~according to claim 4,~~ further comprising a prism and an illumination source; wherein said prism is located coaxially with the omni-directional lens and said illumination source is located to the side of said prism and directed towards said prism; wherein the shape of said prism, the reflectivity of its surfaces, and its location and orientation are selected ~~is designed and positioned such so~~ as to transmit rays that arrive from the direction of said omni-directional lens to the desired location and to refract illumination rays originating at said illumination source towards said omni-directional lens.

Claim 34 (currently amended) An omni-directional imaging assembly according to claim 9, further comprising an image capture device located above and adjacent to said upper surface, directed opposite to the omni-directional lens, said image capture device ~~being designed to cover~~ capturing images of an additional scene, at least partially different from the first scene.

Claim 35 (currently amended) An omni-directional imaging assembly comprising a solid omni-directional lens said omni-directional lens comprising:

- (a) a vertical axis of symmetry;
- (b) an upper surface, at least part of which is capable of reflecting rays that arrive from the inner side of the omni-directional lens;
- (c) a transparent perimeter surface;
- (d) a lower convex surface, at least part of which is capable of reflecting rays that arrive from the direction of said perimeter surface;
- (e) a transparent circular surface maintained in said lower convex surface around said vertical axis of symmetry;

wherein light rays from a first 360 degrees, panoramic, scene are refracted by said transparent perimeter surface, are then reflected by said lower convex surface towards said upper surface, and then reflected by said upper surface towards said transparent circular surface, then refracted and exit said omni-directional lens; and

~~An omni-directional imaging assembly according to claim 1,~~ wherein the omni-directional lens further comprises a hole to the side of the vertical axis of symmetry, said hole extending from the upper surface to the lower surface of said lens; wherein said hole comprises a mechanical channel.

Claim 36 (currently amended) An omni-directional imaging assembly according to claim 35, wherein the dimensions and location of the mechanical channel is ~~used to pass~~ allow the passage of gases, liquids, or

mechanical devices ~~through said mechanical channel~~ for cleaning the exterior of the omni-directional lens.

Claim 37 (currently amended) An omni-directional imaging assembly according to claim 35, wherein the dimensions and location of the mechanical channel allow the passage of ~~used to pass~~ surgical instruments through the omni-directional lens.